Laminated Bamboo: The Engineered Traditional Material

Afzanizam Muhammad
Universiti Teknologi MARA (Perak)
Khairul Awang
Forest Research Institute Malaysia

Abstract

Bamboo is synonymous with culture and tradition within the Malay archipelago. This part of the world has a wide distribution of bamboo species due to the tropical climate. Traditionally, bamboo is one of the popular materials in Malay culture because it thrives within this climate zone. Bamboo that grows in Malaysia consists of various species where some species have certain uses since ancient times in daily life including making home utensils, building materials, weapons, rafts, foods, medicines, and mysticism. The latest technology gives product designers a wide selection of materials. However, the selection of materials is a critical stage because it is necessary to take into account the suitability of the product with the performance of the material to be used. However, despite the advantages of the versatile natural properties of bamboo, but there are still some disadvantages where this material is inferior to other materials especially timber. Addressing its weaknesses, in order to better meet the requirements of daily use today, solid bamboo is modified through modern technology to match with certain functions. This poster presents how the laminated bamboo is fabricated, and how contemporary products look like made from it.

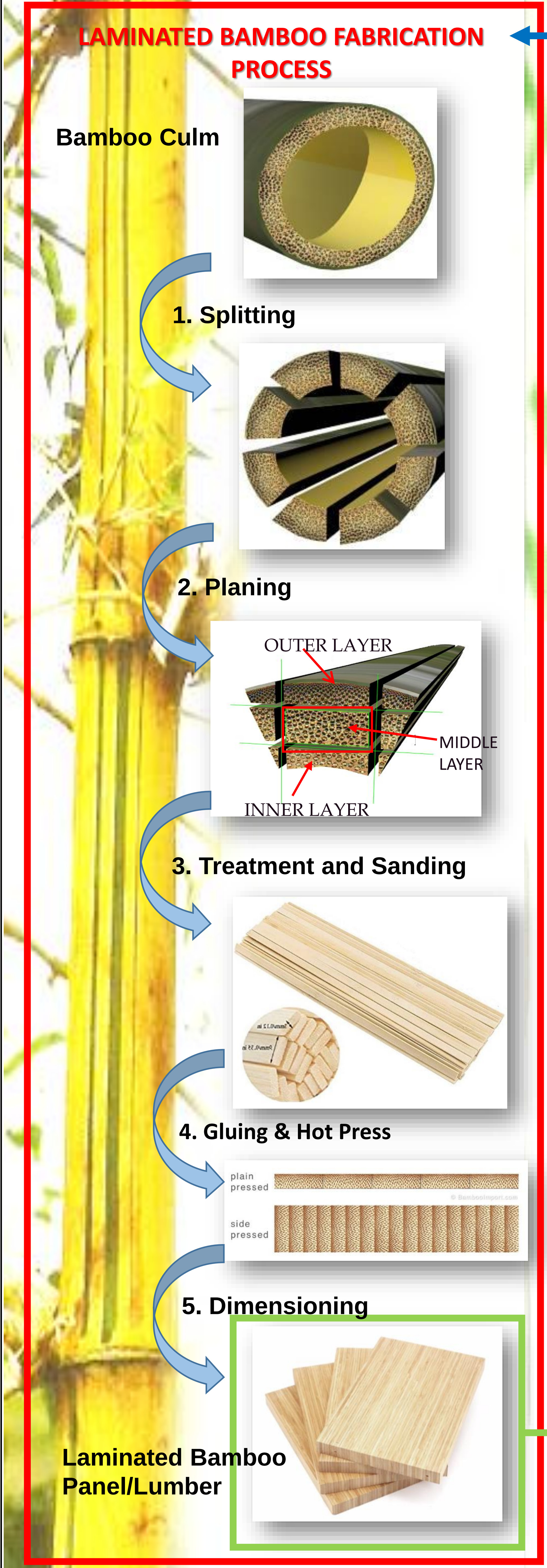
Introduction

Generally in a year bamboo can reach its maximum height and ready to be harvested. Bamboo has characteristics that are absent in timber. Other than its strength and durability, bamboo has a straight shape, is hard but easy to cut, easy to work on and light to transport (Arman, Sopandi, Hutama, Hartanto, & Tardiyana, 2014). The rapid growth rate of bamboo and can be harvested in a very short period of time compared to commercial timber makes the bamboo potential for plantation production without affecting natural forests (Department of Forestry Peninsular Malaysia, 2021). Bamboo has almost the same physical properties as wood allowing it to be easily adapted as an alternative material for solid timber (Arman et al., 2014). There are about 70 bamboo species found in Malaysia with 13 species currently being exploited commercially. Bamboo as a sustainable material is an alternative to timber for a variety of products traditionally and currently (Husain, Kamarulzaman, & Siam, 2020). Traditionally bamboo is very popular as a construction material from buildings to the smallest such as baskets or cages and animal traps. Bamboo can also be used as a sharp tool such as weapons and knives. Today bamboo is more popular among foreign designers, even bamboo thrives and abounds locally.

The Traditional Uses of Bamboo

The Laminated Bamboo

Bamboo has the advantage of elastic flexibility and can be ripped and converted to small slats with just simple machines. The smaller the bamboo slats, the smaller the radius that can be bent. This is an advantage of bamboo that makes it a versatile material in the manufacture of products. However bamboo has a significant disadvantage which is naturally produced with a small volume, this is because, although it has the largest diameter of a mature bamboo hollow in the middle. Therefore it is impossible to obtain a solid component of bamboo in a large dimension as lumber. Addressing this weakness, the engineered product from bamboo has been invented to produce bamboo components with possible sizes that are thicker, wider and stronger as a solid timber alternative. Laminated bamboo has further diversified the capabilities of this traditional material in design innovation to other potential products. This has made the design of equipment and furniture from bamboo can be explored more creatively by contemporary designers.



LAMINATED BAMBOO FABRICATION PROCESS

Bamboo Culm

1. Splitting

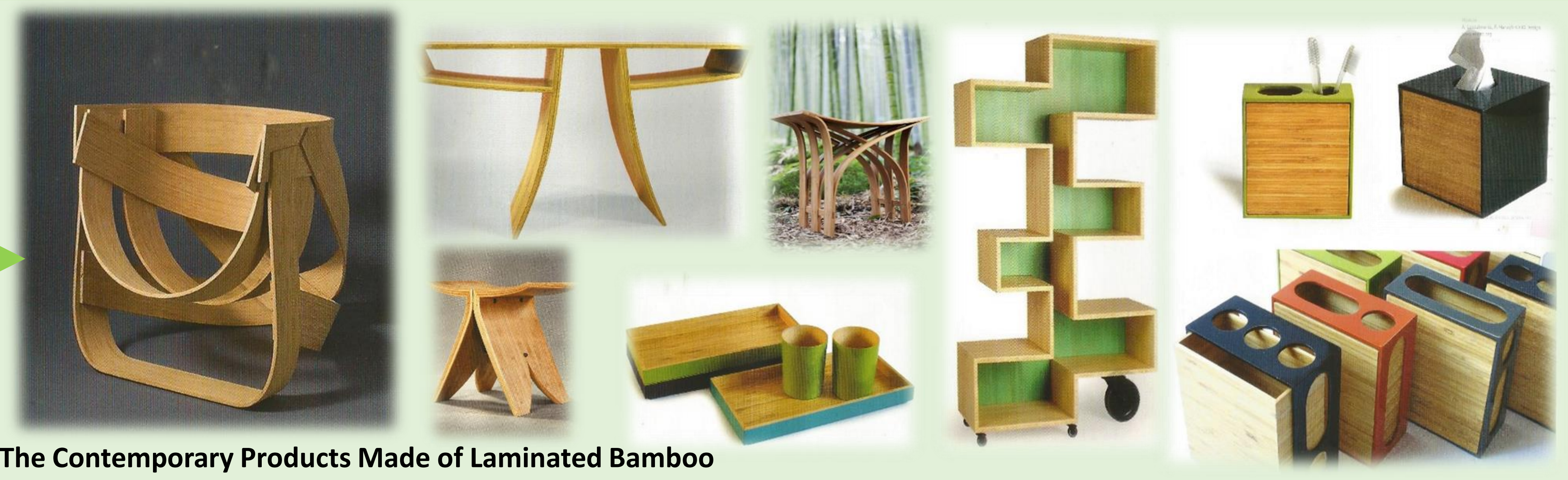
2. Planing

3. Treatment and Sanding

4. Gluing & Hot Press

5. Dimensioning

Laminated Bamboo Panel/Lumber



The Contemporary Products Made of Laminated Bamboo

Conclusion & Recommendation

Bamboo can be considered a sustainable material because it can be replanting with a short harvesting period to ensure the sustainability of the original forest. Its rapid growth ensures ample supply for the future. More importantly, laminated bamboo as an alternative to commercial timbers. In addition, the light natural colour of bamboo allows it to be stained with more colour options, thus giving the designer to produce a more creative products. Laminated bamboo has proven popular among foreign designers, especially in China, not to mention in Malaysia which has the advantage of harvesting bamboo supplies in abundance. Therefore, Laminated bamboo needs to be promoted to the local market and subsequently to the international level. The new generation of Malaysian designers needs to explore laminated bamboo as a material that has great potential to be composed creatively and at the same time can bring the mood of tropical tradition but in more sophisticated. This is because laminated bamboo has been successfully engineered so as to overcome the weaknesses of the original properties of pure bamboo. This will change the branding by consumers to look at bamboo as not like an outdated material.

References: •Anwar, M. S. (2010, January 20). Spesis buluh di Malaysia. *Dewan Kosmik*, 60. •Anwar UMK , Hamdan H , Mohd Parid M, M. F. M. (2019). *Industri Buluh Di Semenanjung Malaysia*. *FRIM Reports*. •Arman, A., Sopandi, S., Hutama, D., Hartanto, R., & Tardiyana, A. D. (Eds.). (2014). *Craftsmanship: Material Consciousness*. Jakarta, Indonesia: IMAJI. •Husain, H., Kamarulzaman, M. S., & Siam, N. A. (2020). *Versatility of Bamboo*. Kepong, Selangor, Malaysia: Forest Research Institute Malaysia, Kepong, Kuala Lumpur, Malaysia. •Jabatan Perhutanan Semenanjung Malaysia. (2021). •Muhammad, A., Harun, S. N., & Mat, N. (2016). The Local Knowledge In Traditional Bamboo Weaving Wall (Tepas) Of Perak State, Malaysia A. In *The 5th International Seminar 2016 on 'Nusantara Heritage"*. Bandung: Institut Seni budaya Indonesia. •Rahim, W. R. W. A., & Idrus, R. M. (2019). Importance and Uses of Forest Product Bamboo and Rattan: their Value to Socioeconomics of Local Communities. *International Journal of Academic Research in Business and Social Sciences*, *8*(12), 1484–1497. •Wahab, R. (2006). *Penanaman Dan Pemprosesan Dalam Penggunaan Buluh*. Kota Kinabalu, Sabah, Malaysia: Universiti Malaysia Sabah.